REMARKS

Pending Claims

Claims 1, 5, 9, 17, 30, 34, and 38 have been amended as shown above. New claims 40-42 have been added. Support for the amendments and new claims can be found throughout the specification and claims as originally filed. No new matter has been added. Claims 2-4, 26-29, and 36-37 have been cancelled without prejudice in view of the amendments. Claims 1, 5-25, 30-35, and 38-42 are pending.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned **"MARKED VERSION OF CHANGES TO THE CLAIMS."**

Summary of the Invention

The present application, in general, relates to methods of making a modified pigment by reacting a pigment having attached a first chemical group with a second chemical group to form said pigment having attached a third chemical group, as well as the modified pigments themselves. Ink compositions, in particular, inkjet ink compositions are also disclosed.

Rejection of Claims Under 35 U.S.C. § 112

Claim 4, 9-11, and 17

The Examiner has rejected the above-identified claims as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In paragraph 2(a) of the Office Action, the Examiner states that claims 4, 9, and 17 each recite improper Markush groups. For the following reasons, this rejection is respectfully traversed.

Claim 4 has been cancelled without prejudice by this amendment, making the rejection of this claims moot. Concerning claims 9 and 17, while Applicants believe that these claims are definite as written, to assist the Examiner, claims 9 and 17 have been amended to include the phrase "consisting of".

In paragraph 2(b) of the Office Action, the Examiner states that the scope of claims 4, 9, and 17 is confusing because it is not clear what compounds are encompassed by the phrase "derivatives of". Specifically, the Examiner asks, "What compounds are considered derivatives?" For the following reasons, this rejection is respectfully traversed.

Claim 4 has been cancelled without prejudice by this amendment, making the rejection of this claim moot. Concerning claims 9 and 17, Applicants believe that these claims are clear as written. For example, claim 9 defines a Markush group which consists of specific chemical groups, salts of those chemical groups, and derivatives of those specific chemical groups – i.e., groups which can be derived from any of the previously listed groups. Examples of such derivatives are cited throughout the specification and, in particular, Table 1, page 8. Similarly, claim 17 defines a Markush group which includes derivatives of the specifically listed polymers.

Therefore, Applicants believe that the above-identified claims are not indefinite and respectfully request that the rejection be withdrawn.

Rejection of Claims Under 35 U.S.C. § 102

Claims 1, 3-9, 21-24, and 34

The Examiner has rejected the above-identified claims as being anticipated by Bruhnke (U.S. Patent No. 5,766,268). In paragraph 4 of the Office Action, the Examiner states that Bruhnke discloses a method of making a modified pigment, ABXYZ, which comprises reacting a chromophore, A, having attached an electrophile group, B, such as sulfatoethylsulfone, with

nucleophilic group, X, which is attached to a polyoxyalkylene, Y. The Examiner further states that the modified pigment is used in an ink composition. The Examiner concludes that Bruhnke anticipates the present claims. Applicants respectfully disagree.

Claims 1 and 5-9 of the present application relate to a method of making a modified pigment comprising reacting a pigment having attached a first chemical group. Bruhnke discloses colorant compositions prepared from a reactive dye, AB (for example, see the abstract and column 3, line 55 to column 4, line 44). A dye is chemically quite different from a pigment, and one skilled in the art would not equate the reactions of a dye with those of a pigment. Moreover, claim 1 of the present application relates to a method of making a modified pigment comprising reacting a pigment having attached a first chemical group, wherein said pigment having attached said first chemical group is prepared by reacting a diazonium salt having a first chemical group with at least one type of pigment. Bruhnke et al. does not disclose such a method. Applicants therefore believe that claims 1 and 5-9 are not anticipated by this reference.

Claims 21-24 of the present application relate to a modified pigment having attached at least one organic group. For the reasons cited above, Bruhnke does not teach or suggest the modified pigments of the present invention, and Applicants therefore believe that claims 21-24 are not anticipated by this reference.

Claim 34 of the present application relates to an ink composition comprising a liquid vehicle and a modified pigment, wherein the modified pigment comprises a pigment having attached at least one organic group. For the reasons cited above, Bruhnke does not teach or suggest the modified pigment of the present invention and therefore does not teach or suggest the ink composition of claim 34. Applicants therefore believe that claim 34 is not anticipated by this reference.

Claims 3 and 4 have been cancelled without prejudice by this amendment, making the rejection of these claims moot.

Therefore, Applicants believe that the above-identified claims are not anticipated by Bruhnke and respectfully request that the rejection be withdrawn.

Claims 1, 3-5, 8-13, 30-32 and 38-39

The Examiner has rejected the above-identified claims as being anticipated by Moffatt et al. (U.S. Patent No. 6,221,932). In paragraph 5 of the Office Action, the Examiner states that Moffatt et al. discloses a method for making a modified pigment comprising reacting a pigment having attached an electrophilic functional group with a nucleophilic group-containing polymer such as polyethylene glycol, polyamine, and polyethyleneimine. The Examiner further states that the reaction occurs by nucleophilic substitution or acylation reaction and that the modified pigment is suitable for use in ink jet ink. The Examiner concludes that Moffatt et al. anticipates the present claims. Applicants respectfully disagree.

Claim 1 of the present application relates to a method of making a modified pigment comprising reacting a pigment having attached a first chemical group with a second chemical group to form said pigment having attached a third chemical group. The pigment having attached a first chemical group is prepared by reacting a diazonium salt having the first chemical group with at least one type of pigment to form said pigment having attached a first chemical group. The first chemical group, the second chemical group, and the third chemical group each comprises at least one organic group selected from the group consisting of: acyl azides, isocyanates, ketones, aldehydes, anhydrides, amides, imides, imines, α,β–unsaturated ketones and aldehydes, alkyl halides, epoxides, alkyl sulfonates and sulfates, amines, hydrazines, thiols, hydrazides, oximes, carbanions, aromatic compounds, and salts and derivatives thereof.

In comparison, Moffatt et al. describes the reaction of modified pigments which comprise an ester group or activated ester group which can undergo nucleophilic substitution of acylation reactions (see column 4, lines 35-39). The groups identified by Moffatt et al. are shown in the diagram spanning columns 4 and 5. These are not the groups disclosed in claim 1. Applicants therefore believe that claims 1, 5, and 8-13 are not anticipated by this reference.

Claims 30-32 of the present application relate to a modified pigment having attached at least one organic group, wherein said organic group comprises the reaction product of at least one electrophile and a nucleophilic polymer, and an acylating agent. Claims 38-39 relate to inkjet ink compositions comprising this modified pigment. For the reasons cited above, Moffatt

et al. does not teach or disclose the modified pigments of the present invention. In addition, Moffatt et al. does not disclose the modified pigment of the present invention further reacted with an acylating agent and therefore does not disclose an inkjet ink composition comprising such a modified pigment. Applicants therefore believe that claims 30-32 and 38-39 are not anticipated by this reference.

Claims 3 and 4 have been cancelled without prejudice by this amendment, making the rejection of these claims moot.

Therefore, Applicants believe that the above-identified claims are not anticipated by Moffatt et al. and respectfully request that the rejection be withdrawn.

Claims 1, 3-5, 8-9, 12, 14-15, 20, 30-33, and 38-39

The Examiner has rejected the above-identified claims as being anticipated by Ikeda et al. (U.S. Patent No. 5,952,429). In paragraph 6 of the Office Action, the Examiner states that Ikeda et al. discloses a method for making a modified pigment comprising reacting a carbon black pigment which comprises an electrophilic functional group with polymer which comprises nucleophilic reactive group. The Examiner further states that Ikeda et al. discloses that this product is then further reacted with an additional organic group such as succinic anhydride and that the modified pigment is suitable for use in ink jet inks. The Examiner concludes that Ikeda et al. anticipates the present claims. Applicants respectfully disagree.

Claim 1 of the present application relates to a method of making a modified pigment comprising reacting a pigment having attached a first chemical group with a second chemical group to form said pigment having attached a third chemical group. The pigment having attached a first chemical group is prepared by reacting a diazonium salt having the first chemical group with at least one type of pigment to form said pigment having attached a first chemical group. Ikeda et al. teaches a method of preparing a carbon black graft polymer by reacting a carbon black with a polymer having a reactive group capable of reacting with a functional group on the surface of the carbon black. The carbon black is required to have a functional group such as a carboxyl group or a hydroxyl group (see column 16, lines 34-38). These are carbon blacks

known in the art as acidic carbon blacks and are referred to as such in column 16, lines 44-48. Ikeda et al. does not disclose reacting a pigment having attached a first chemical group prepared by reacting a diazonium salt having the first chemical group with at least one type of pigment. Applicants therefore believe that claims 1, 5, 8-9, 12, and 14-15 are not anticipated by this reference.

Claim 20 of the present application relates to the method of making a modified pigment as described above, further comprising reacting the third chemical group attached to the pigment with at least one additional second chemical group and, in particular, succinic anhydride. While Ikeda et al. does disclose that the resulting carbon black graft polymer may be further reacted with an acid anhydride (column 42, lines 6-13), for the reasons cited above, these are not the modified pigments of the present invention. Applicants therefore believe that claim 20 is not anticipated by this reference.

Claims 30-33 of the present application relate to a modified pigment having attached at least one organic group, wherein said organic group comprises the reaction product of at least one electrophile and a nucleophilic polymer, and an acylating agent, wherein the organic group is attached by reacting a diazonium salt having the electrophile with at least one type of pigment. Claims 38-39 relate to inkjet ink compositions comprising this modified pigment. For the reasons cited above, Ikeda et al. does not teach or disclose the modified pigments of the present invention. In addition, Ikeda et al. does not disclose the modified pigment of the present invention further reacted with an acylating agent and therefore does not disclose an inkjet ink composition comprising such a modified pigment. Applicants therefore believe that claims 30-32 and 38-39 are not anticipated by this reference.

Claims 3 and 4 have been cancelled without prejudice by this amendment, making the rejection of these claims moot.

Therefore, Applicants believe that the above-identified claims are not anticipated by Ikeda et al. and respectfully request that the rejection be withdrawn.

Claims 1-5, 8-9, 12-13, 26-28, and 36-37

The Examiner has rejected the above-identified claims as being anticipated by PCT Publication No. WO 99/51690. In paragraph 7 of the Office Action, the Examiner states that WO 99/51690 discloses a method of making a modified pigment comprising reacting a pigment having an attached chemical group such as benzoic acid which is prepared by reacting a diazonium salt having the chemical group with the pigment to produce a modified pigment which is then reacted with amine-containing polymer such as polyvinyl alcohol or polyacrylate. The Examiner further states that the pigments include blue, black, brown, red, yellow, etc. pigments including carbon black as well as the use of the modified pigment in ink jet inks. The Examiner concludes that WO 99/51690 anticipates the present claims. Applicants respectfully disagree.

Claim 1 of the present application relates to a method of making a modified pigment comprising reacting a pigment having attached a first chemical group with a second chemical group to form said pigment having attached a third chemical group. The pigment having attached a first chemical group is prepared by reacting a diazonium salt having the first chemical group with at least one type of pigment to form said pigment having attached a first chemical group. While WO 99/51690 teaches modified pigment products having attached groups and, in particular, polymeric groups such as polyvinyl alcohol and polyacrylates, the method described for preparing these modified products involves the attachment of a polymer or surfactant by a diazonium salt (see, for example, page 8, line 34 to page 9, line 2 and page 9, line 25 to page 10, line 9, and examples 2, 8, and 12 which describe the preparation of modified carbon blacks prepared by a diazonium attachment). This method of preparing modified pigments is not the method of the present invention. Furthermore, WO 99/51690 does not teach or suggest reacting a modified pigment with a second chemical group to form a third chemical group as recited in claim 1 of the present invention. Applicants therefore believe that claims 1, 5, 8-9 and 12-13 are not anticipated by this reference.

Claims 3-4, 26-28, and 36-37 have been cancelled without prejudice by this amendment, making the rejection of these claims moot.

Therefore, Applicants believe that the above-identified claims are not anticipated by WO 99/51690 and respectfully request that the rejection be withdrawn.

Claims 1-5, 8-9, 12, and 14-19

The Examiner has rejected the above-identified claims as being anticipated by PCT Publication No. WO 99/31175. In paragraph 8 of the Office Action, the Examiner states that WO 99/31175 discloses a method of making a modified pigment comprising reacting carbon black pigment which has an attached organic group which has an attached ionic group with at least one polymer which attaches to the ionic group. The Examiner concludes that WO 99/31175 anticipates the present claims. Applicants respectfully disagree.

Claim 1 of the present application relates to a method of making a modified pigment comprising reacting a pigment having attached a first chemical group with a second chemical group to form said pigment having attached a third chemical group. The pigment having attached a first chemical group is prepared by reacting a diazonium salt having the first chemical group with at least one type of pigment to form said pigment having attached a first chemical group. The first chemical group, the second chemical group, and the third chemical group each comprises at least one organic group selected from the group consisting of: acyl azides, isocyanates, ketones, aldehydes, anhydrides, amides, imides, imines, α,β–unsaturated ketones and aldehydes, alkyl halides, epoxides, alkyl sulfonates and sulfates, amines, hydrazines, thiols, hydrazides, oximes, carbanions, aromatic compounds, and salts and derivatives thereof.

In comparison, WO 99/31175 describes several modified carbon products and methods for preparing them. One method disclosed is a diazonium attachment (see, for example, page 6, line 26 to page 7, line 11). A second method involves a reaction of modified pigments comprising an acid group (see page 15, line 25 to page 16, line 6 and the diagram therein as well as Example 3). Finally, a third method involves the exchange of a counter-ionizable group (see page 16, line 27 to page 17, line 23 and the diagram therein). The groups disclosed by WO 99/31175 are not the groups disclosed in claim 1. Applicants therefore believe that claims 1, 5, 8-9, 12, and 14-19 are not anticipated by this reference.

Claims 3 and 4 have been cancelled without prejudice by this amendment, making the rejection of these claims moot.

Therefore, Applicants believe that the above-identified claims are not anticipated by WO 99/31175 and respectfully request that the rejection be withdrawn.

Claims 1, 3-5, 8-9, and 13

The Examiner has rejected the above-identified claims as being anticipated by Kwan (U.S. Patent No. 6,235,829). In paragraph 9 of the Office Action, the Examiner states that Kwan discloses a method of making a modified pigment comprising reacting pigment which as functional group such a carboxylic acid, hydroxyl amino, and N, S, or O containing group with polymer which has reactive group such as hydroxyl, carboxylic, isocyanate, and amine group. The Examiner concludes that Kwan anticipates the present claims. Applicants respectfully disagree.

Claim 1 of the present application relates to a method of making a modified pigment comprising reacting a pigment having attached a first chemical group with a second chemical group to form said pigment having attached a third chemical group. The pigment having attached a first chemical group is prepared by reacting a diazonium salt having the first chemical group with at least one type of pigment to form said pigment having attached a first chemical group. Kwan teaches a method of making a non-polar suspension of chargeable pigment particles by contacting pigment particles with a polymer resin having a reactive group. The pigment particles are described being both inherently ionic or chargeable and having surface anchoring groups, which react with the reactive groups of the polymer (column 2, line 51 to column 3, line 26). However, unlike the present application, Kwan does not teach or suggest that either of these groups are attached by a diazonium salt. Thus, Kwan does not disclose the method of the present application since this reference does not teach or suggest the modified pigments of the present application. Applicants therefore believe that claims 1, 5, 8-9, and 13 are not anticipated by this reference.

Claims 3 and 4 have been cancelled without prejudice by this amendment, making the rejection of these claims moot.

Therefore, Applicants believe that the above-identified claims are not anticipated by Kwan and respectfully request that the rejection be withdrawn.

Claims 1 and 13

The Examiner has rejected the above-identified claims as being anticipated by Aida et al. (U.S. Patent No. 5,716,435). In paragraph 10 of the Office Action, the Examiner states that Aida et al. discloses a method of making a modified pigment comprising reacting a pigment having attached electrophilic group with a nucleophilic group. The Examiner concludes that Aida et al. anticipates the present claims. Applicants respectfully disagree.

Claim 1 of the present application relates to a method of making a modified pigment comprising reacting a pigment having attached a first chemical group with a second chemical group to form said pigment having attached a third chemical group. The pigment having attached a first chemical group is prepared by reacting a diazonium salt having the first chemical group with at least one type of pigment to form said pigment having attached a first chemical group. Aida et al. relates to a salt-milling method for preparing a water-based dispersion of an organic pigment (A) which may contain a pigment derivative (D) or a resin (E). However, while pigment derivative (D) is described as a derivative of an organic pigment (column 5, line 11), it is not the modified pigment of the present application. For example, pigment derivative (D) is not prepared by the reaction of a pigment with a diazonium salt. In addition, pigment derivative (D) contains an organic pigment residue, P. P is not a pigment. Rather, P is an organic pigment residue, a heterocyclic ring residue, or an aromatic polycyclic compound residue (column 5, lines 18-19). Column 5, lines 29-34, which describes examples of residue P, further shows that P is not a pigment as in the present invention. Since P is not a pigment but rather a chemical residue (i.e. chemical radical or group) of a pigment, pigment derivative (D) is also not a pigment. Furthermore, no teaching of a chemical reaction of pigment derivative (D) or resin (E) with the organic pigment (A) is described.

Therefore, Applicants believe that the above-identified claims are not anticipated by Aida et al. and respectfully request that the rejection be withdrawn.

Rejection of Claims under 35 U.S.C. § 103(a)

Claim 25

The Examiner has rejected claim 25 as being unpatentable over Bruhnke (U.S. Patent No. 5,766,268) in view of Moffatt et al. (U.S. Patent No. 6,221,932). In paragraph 13 of the Office Action, the Examiner states that, in light of the motivation for using specific types of polymers disclosed by Moffatt et al., it would have been obvious to one of ordinary skill in the art to use such a polymer in the pigment of Bruhnke in order to produce an ink with increased smearfastness, enhanced print quality, and improved bleed control, and thereby arrive at the claimed invention. Applicants respectfully disagree.

Claim 25 of the present application relates to a modified pigment having attached at least one organic group comprising the reaction product of at least one (2-sulfatoethyl)-sulfone group and at least one nucleophilic polymer, wherein the nucleophilic polymer is polyethyleneimine or derivatives or salts thereof. As discussed above, Bruhnke relates to dyes while Moffatt et al. relates to pigments. Therefore, one skilled in the art would not combine the teaching of the dyes of Bruhnke with those of the pigments of Moffatt et al.

Therefore, Applicants believe that claim 25 is patentable over Bruhnke in view of Moffatt et al. and respectfully request that this rejection be withdrawn.

Claims 29

The Examiner has rejected claim 29 as being unpatentable over WO 99/51690 in view of Moffatt et al. (U.S. Patent No. 6,221,932). In paragraph 14 of the Office Action, the Examiner states that, in light of the motivation for using specific types of polymers disclosed by Moffatt et al., it would have been obvious to one of ordinary skill in the art to use such a polymer in the

pigment of WO 99/51690 in order to produce an ink with increased smearfastness, enhanced print quality, and improved bleed control, and thereby arrive at the claimed invention.

While Applicants respectfully disagree, claim 29 has been cancelled without prejudice by this amendment, making the rejection of this claim moot.

Claim 35

The Examiner has rejected claim 35 as being unpatentable over Bruhnke (U.S. Patent No. 5,766,268). In paragraph 15 of the Office Action, the Examiner states that it would have been within the skill level of one of ordinary skill in the art to recognize that the broad disclosure of ink by Bruhnke encompasses all types of ink including ink jet ink. The Examiner concludes that it would have been obvious to one of ordinary skill in the art to use the modified pigment of Bruhnke in any type of ink, including ink jet ink, and thereby arrive at the claimed invention. Applicants respectfully disagree.

Claim 35 of the present application relates to an ink jet ink composition comprising a liquid vehicle and a modified pigment. The modified pigment comprises a pigment having attached at least one organic group. As discussed above, Bruhnke relates to dyes and not pigments. Therefore, even under § 103, Bruhnke does not teach or suggest the modified pigments of the present application and therefore does not teach or suggest the ink jet ink of claim 35. In addition, contrary to the Examiner's conclusion, one skilled in the art would not presume that a broad disclosure of an ink could be used as an ink jet ink. There are many types of inks which cannot typically be used under the demanding constraints of an ink jet ink application, including inks for ball point pens. Thus, without any disclosure of ink jet inks, the Examiner's conclusions are not supported by the art of record.

Therefore, Applicants believe that claim 35 is patentable over Bruhnke and respectfully request that this rejection be withdrawn.

Conclusion

This application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, that a telephone conference would further expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,

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MARKED VERSION OF CHANGES TO THE CLAIMS

IN THE CLAIMS

Please cancel claims 2-4, 26-29, and 36-37 without prejudice.

Please amend the claims as follows:

1.(Amended) A method of making a modified pigment comprising reacting a pigment having attached a first chemical group with a second chemical group to form said pigment having attached a third chemical group, wherein the second chemical group reacts with the first chemical group to form the third chemical group, and said first chemical group comprises at least one electrophile and said second chemical group comprises at least one nucleophile, or vice versa, wherein said pigment having attached a first chemical group is prepared by reacting a diazonium salt having the first chemical group with at least one type of pigment to form said pigment having attached a first chemical group, and wherein the first chemical group, the second chemical group, and the third chemical group each comprises at least one organic group selected from the group consisting of: acyl azides, isocyanates, ketones, aldehydes, anhydrides, amides, imides, imines, α,β–unsaturated ketones and aldehydes, alkyl halides, epoxides, alkyl sulfonates and sulfates, amines, hydrazines, thiols, hydrazides, oximes, carbanions, aromatic compounds, and salts and derivatives thereof.

5.(Amended) The method of claim 1, wherein the first chemical group comprises an alkylsulfate group[, a carboxylic acid group, or a salt of a carboxylic acid group].

9.(Amended) The method of claim 8, wherein the polymer is selected from the group consisting of: a polyamine, a polyalkylene oxide, a polyol, a polyacrylate, and salts and derivatives thereof.

17.(Amended) The method of claim 16, wherein the polymer is selected from the group consisting of: a polyamine, a polyol, a polyalkylene glycol, a polyacrylate, a protein, a polyamino acid, and salts and derivatives thereof.

30.(Amended) A modified pigment comprising a pigment having attached at least one organic group, wherein said organic group comprises: the reaction product of at least one electrophile and a nucleophilic polymer; and an acylating agent, wherein the organic group is attached by reacting a diazonium salt having the electrophile with at least one type of pigment.

34.(Amended) An ink composition comprising a liquid vehicle and a modified pigment, wherein the modified pigment comprises a pigment having attached at least one organic group, wherein said organic group comprises: the reaction product of [a pigment having attached] at least one (2-sulfatoethyl)-sulphone group and at least one nucleophilic polymer.

38.(Amended) An ink composition comprising a liquid vehicle and a modified pigment, wherein the modified pigment comprises a pigment having attached at least one organic group, wherein said organic group comprises: the reaction product of [a pigment having attached] at least one electrophile and a nucleophilic polymer; and an acylating agent, wherein the organic group is attached by reacting a diazonium salt having the electrophile with at least one type of pigment.

Please add the following new claims:

40.(New) A method of making a modified pigment comprising reacting a pigment having attached a first chemical group with a second chemical group to form said pigment having attached a third chemical group, wherein the second chemical group reacts with the first chemical group to form the third chemical group, and said first chemical group comprises an alkylsulfate group.

41.(New) The method of claim 40, wherein the first chemical group comprises a (2-sulfatoethyl)-sulphone group.

42.(New) The method of claim 41, wherein the first chemical group is phenyl-(2-sulfatoethyl)-sulphone.